



Mission Overview

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Mission Design (1 of 2)



- **Hipparcos Style Observing Concept**
 - **One Passive Observation Mode**
 - **No Active Attitude Compensation**
- **Fixed, Non-Deployable Solar Arrays**
 - **Serve As Thermal Shield for Instrument**
 - **Harness Solar Pressure for Spin Axis Precession**
 - **Collect Energy for Batteries Used During Observatory Operations and During Eclipses**
- **Redundancy in Selected Subsystems**
 - **Balance Cost Constraints While Maximizing Reliability/Mission Success**



Mission Design (2 of 2)



- **Observatory Operates at GEO**
 - **Minimizes Gravitational and Magnetic Torques**
 - **Provides Continuous Data Downlink, Allows Single Ground Station**
- **Launch Vehicle Places Flight Vehicle in GTO**
 - **On-Board Apogee Kick Motor (AKM) Used to Circularize Orbit**
 - **AKM Jettisoned to Maintain Operational Spin Balance Requirements**
- **Blossom Point, MD Used As Mission Operations Facility**
 - **Augmented With DSN Support During GTO Phase**



FAME History



- **08/98 FAME Initial Proposal Submitted Under AO-98-OSS-03**
- **02/99 FAME Selected to Provide Phase A Concept**
- **06/99 Phase A Concept Study Report Submitted**
- **10/99 Fame Selected As One of Two MIDEX Missions**
 - **Program to Start 10/99 With Limited Funds for Long Lead Procurements in FY00**
- **10/00 Start of Phase B Activities**
- **12/00 FAME System Requirements Review**
- **07/01 FAME Rescope/Descope Begins**
- **10/01 FAME Preliminary Design Review**



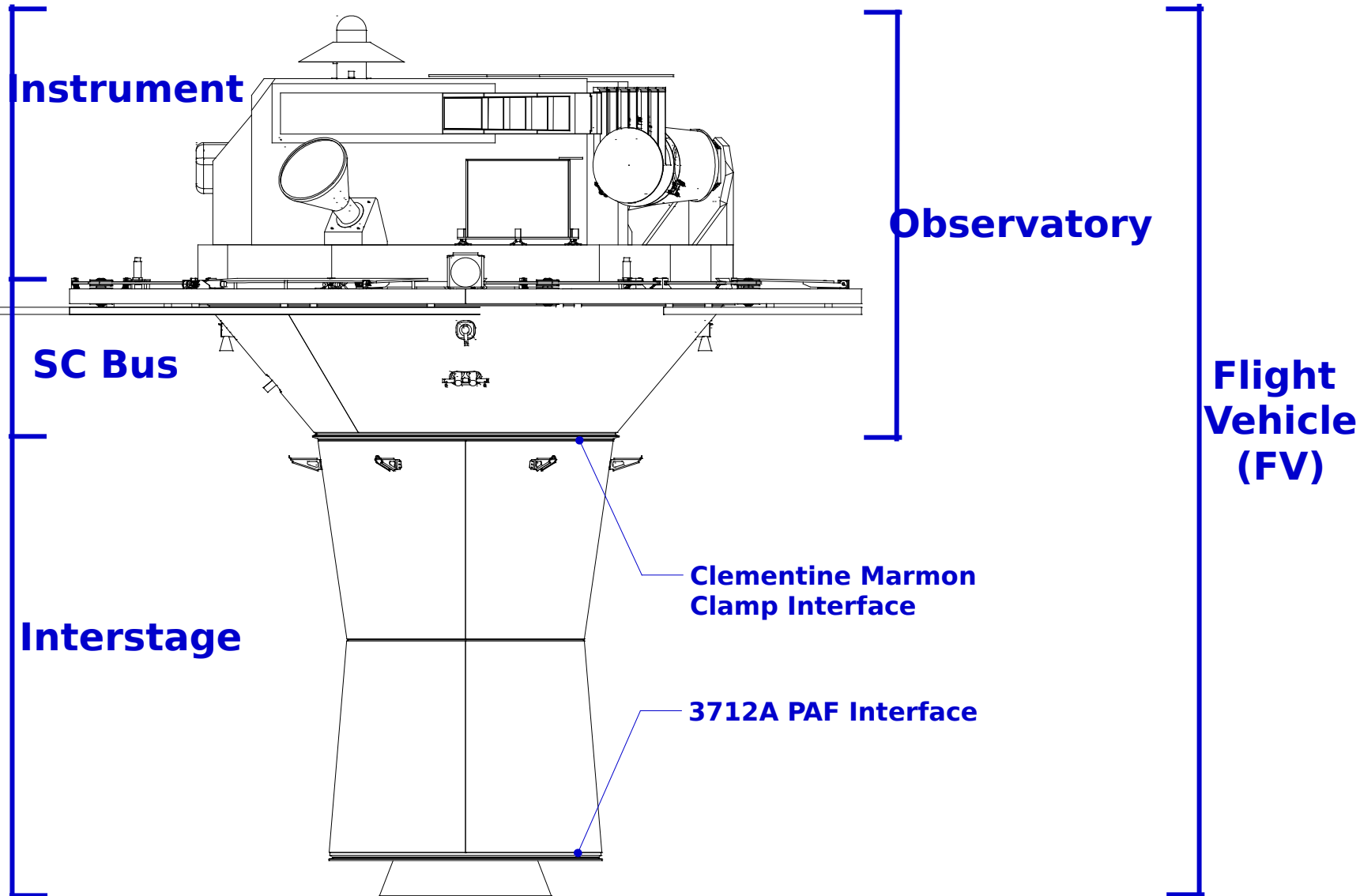
Rescope Efforts



- **June '01 - Development Cost for the CSR Version of FAME Exceeded Original Estimates**
- **July - August '01 - Program Wide Descope/Redesign Efforts Undertaken to Reduce Overall Program Costs While Maintaining 50 mas Science**
 - **Decreased Operational Sun Angle From 45 to 35 Degrees**
 - **Reduced Size of Instrument by 30%**
 - **Reduced Number of CCDs from 24 to 13**
 - **Reduced System Power by 40%**
 - **Eliminated Deployable Solar Array Sun Shield**
- **September '01 - Overall Program Costs Greatly Reduced but Still Did Not Meet NASA-HQ Cost Cap**
 - **Further Redesigns Explored to Reduce Costs**
 - **Redesign S/C Bus for Smaller Delta Launch Vehicle (7425-10)**
- **October '01 - Froze Design Modifications for PDR**
 - **Allow for Analysis of Designs**

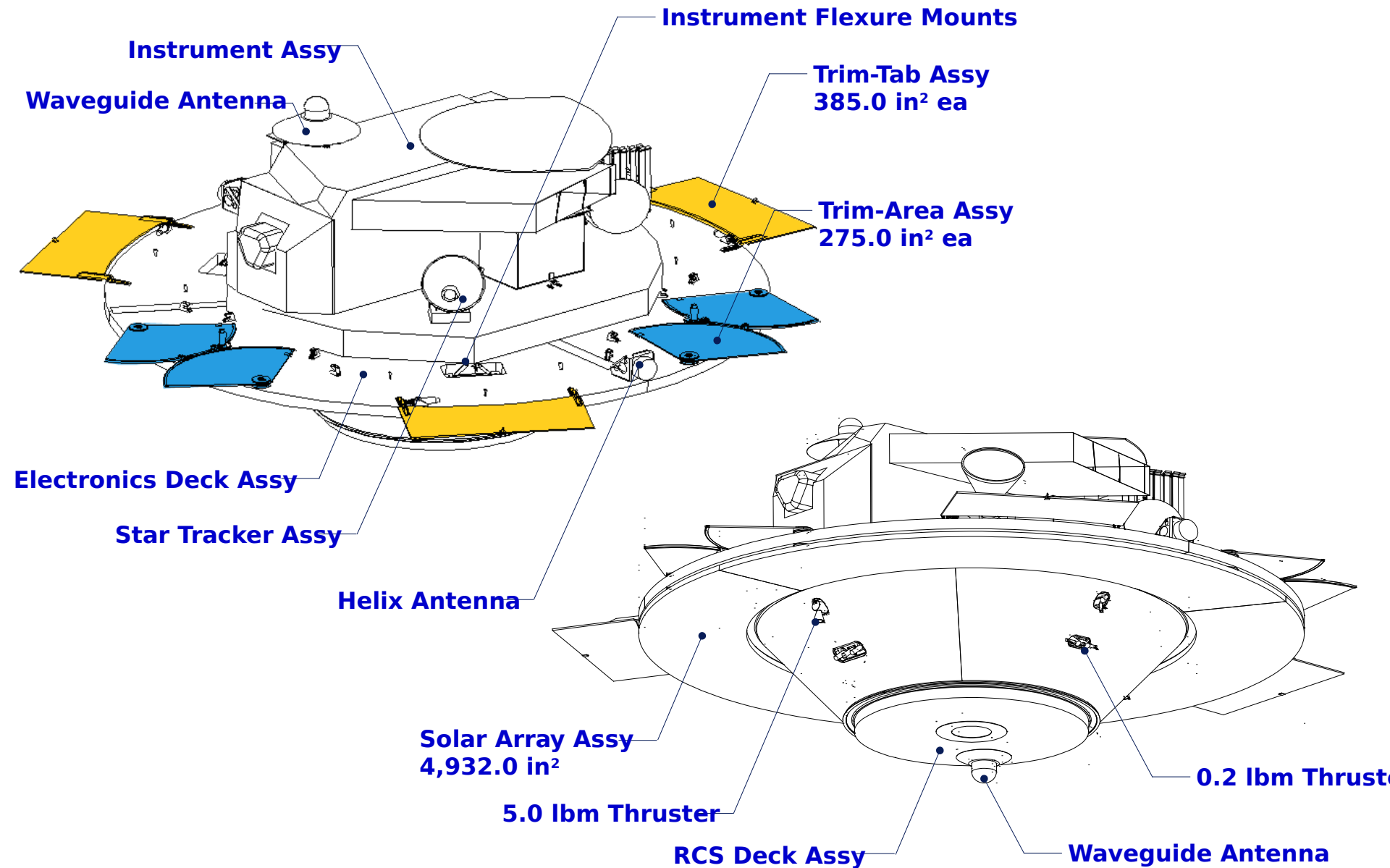


S/C Nomenclature



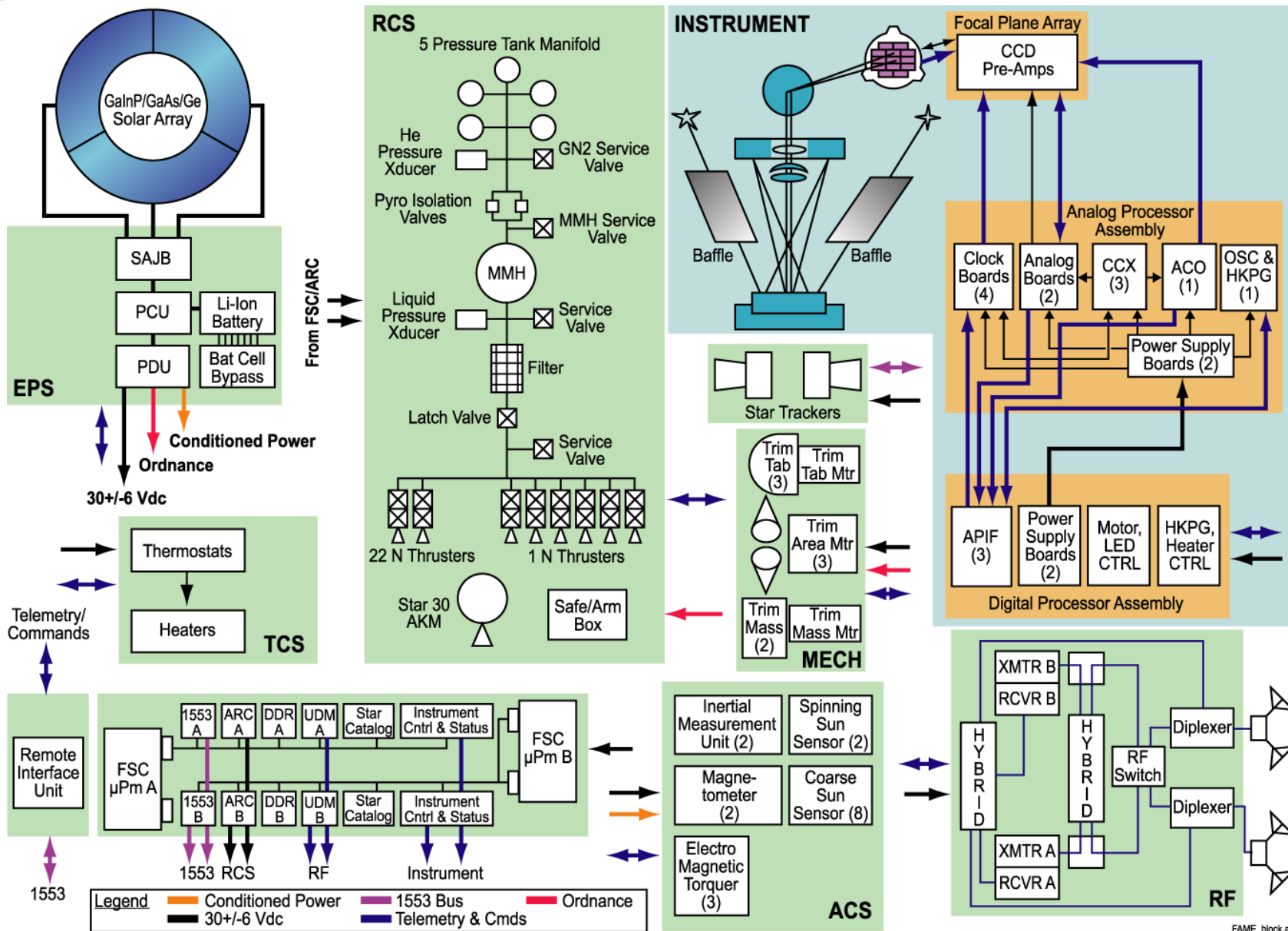


Operational Configuration



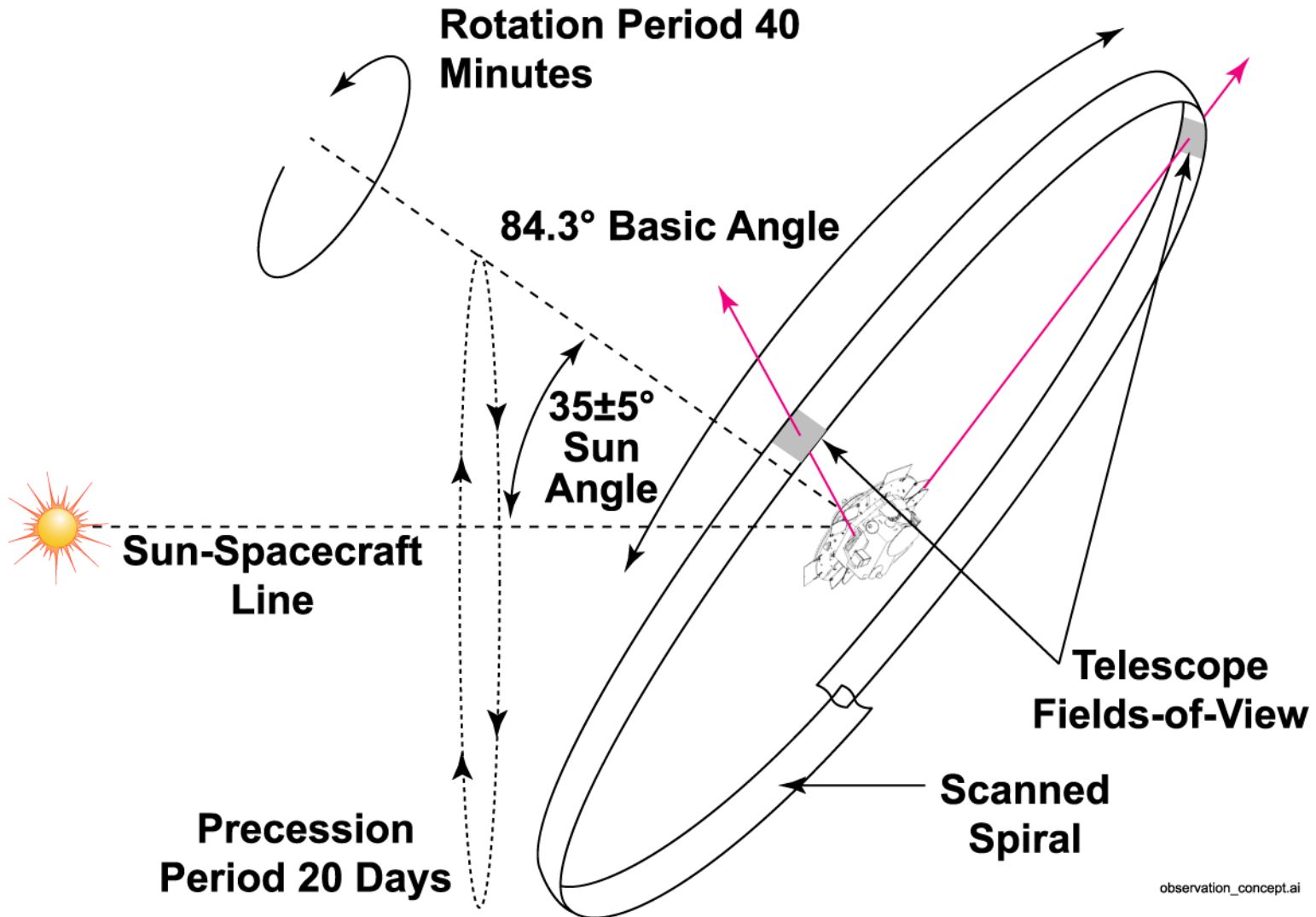


Observatory Block Diagram





Observation Concept



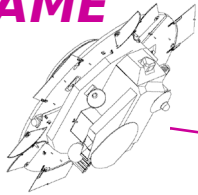
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Operations Concept



FAME



Telemetry, Tracking, & Commands

MOC
NRL Blossom Point Ground Station
Blossom Point, MD

Primary RF
Front End



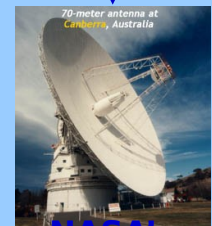
Backup RF
Front End



S/C State of Health Monitoring
& Command File Uplink
24/7 Operation
SOH Archive

Launch and
Emergenci
es Only

JPL NOCT



NASA's
Deep
Space
Network

SOC



FAME Science & Mission
Planning Center
USNO, Washington, DC
Science Data Archive

- Command Files
- Tasking Files
- Star Catalog Uploads
- Gzipped Mission Data & Housekeeping Telemetry Recording Files, Pushed via FTP
- Housekeeping Telemetry, Ground Station Statistics, Scheduling Info via Streaming TCP Socket Connection
- State Vector Files, Pushed via FTP
- S/C Bus SOH Reports
- Weekly Plan Files

T1



FAME Operational Orbit



- **Drifting Geosynchronous Elliptical Orbit**
 - **Inclination Set by Launch Site at 28.7°**
 - **Chose 105° West Longitude to Minimize Longitudinal Variation**
 - **Eccentric to Avoid Geostationary Belt**
 - **No N-S Thrusting Planned**
 - **No E-W Station-Keeping Anticipated, Provided Good Initial Orbit Insertion**



Mission Phases



- **Initial Launch Capacity (ILC) Is October 31, 2004**
- **GTO - Launch on Delta 7425-10 to a Geosynchronous Transfer Orbit (GTO)**
 - **Apogee 500 km Below GEO**
 - **Inclination Set by Launch Site to 28.7 Degrees**
- **Sub-GEO - Apogee Kick Motor Fired After 1½ Days to Place FAME in a Circular Sub-GEO Orbit Drifting to the East**
 - **AKM Is Jettisoned During This Phase**
- **GEO - FAME Performs a Number of RCS Burns to Place the Observatory in an Elliptical GEO Orbit at 105 Degrees West Longitude**
- **Disposal - At the End of the Mission, FAME Performs RCS Burns to Raise Perigee to 335 km Above GEO**



FAME Coverage During Orbit Transfer

